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(54) SMD POSSIBLE ELECTRET CONDENSER MICROPHONE

Abstract

Machine Translation | Human Translation

1 The invention relates to the structure of stronging against the high temperature. And it is about the electret condenser microphone capable of SMD it becomes. In the electric condenser microphone which the microphone of such invention is included of the case and polar ring, diaphragm, spacer, the back plate, the first base, the second base, PCB, the first base is to the structure of protecting diaphragm, spacer and back plate and the property of the electret formed at the surface mounting device (SMD) reflow process in diaphragm or the back plate is not degraded. Moreover, the IC device having the gain high in order to be caused by since the potential value of electret fall from the SMD reflow process and the desensitization of microphone is prevented is used. In this way, the present invention is to provide the electret microphone capable of the surface mounting device (SMD) it uses the gas exhaust groove formation and connection terminal in the fifth connection terminal to the projecting shape the IC device having the gain using main components as for high temperature insulating material of Polymer or the plastic series or the fluorine resin series, and the second first base is to the structure of protecting the parts of the phonic sound system cask, and attaches to the part to the third for high temperature cream solder to PCB of microphone, and fourthly highs the first.

▶ Representative Drawing(s)

Fig. 2

▶ Keyword(s)

The SMD, electret, diaphragm, back plate, microphone, high temperature material.

Descritption

Brief explanation of the drawing

Fig. 1 is a schematic diagram showing the conventional electric condenser microphone

Fig. 2 is a drawing showing the electric condenser microphone possibling the SMD according to the present invention

Fig. 3 is a plane view showing the example of the connection terminal illustrated in Fig. 2

Fig. 4 is a cross-sectional view of the connection terminal illustrated in Fig. 3

Fig. 5 is a plane view showing the example forming the BGA ball in the connection terminal illustrated in Fig. 2

The Fig. 6 is the cross-sectional view of the connection terminal illustrated in Fig. 5.

* The description of reference numerals showing the main elements in drawings.

202: case 204: polar ring.

206: diaphragm 208: spacer.

210: back plate 212: first base.

214: second base 216: PCB.

218: IC 220: connection terminal.

221~ 223: ground terminal 225: vdd terminal.

227: gas exhaust groove.

Details of the Device

Purpose of the Device

The Technical Field to which the Device Belongs and the Prior Art in that Field

The invention relates to the electric condenser microphone. And more specifically, it is about the electret condenser microphone capable of SMD it is to the structure of stronging against the high temperature.

It is included of the field effect transistor (JFET) for buffering diaphragm / back plate pair forming the capacitor (C) coping with voltage bias element (it is included of the ordinarily, and electret), and sound pressure and the typical condenser microphone changes and output signal. Here, in the electric condenser microphone, electret is formed among the diaphragm or the back plate in a one. The front electret lice that electret is formed in diaphragm. The white electret lice to be formed on the back plate. Generally, it compulsively injects the electric charge in the organic plastic film and electret is formed.

Fig. 1 is a schematic diagram showing the conventional electric condenser microphone.

The conventional electret microphone is composed of the case (102), and the PCB (116). The case (102) is as shown in Fig. 1 to the cylinder metal. As to the PCB (116), the first base (112) of the ring type, which is to the polar ring (104), diaphragm (106), spacer (108), back plate (110), insulator which is to conductor the second base (114) which is to conductor, and the circuit component (118) is mounted and connection terminals (120,122) are formed.

20 There is a problem that it is signal-changed in the temperature with high charge value of electret the material of the high temperature was used impossible the material of the parts was mostly not the material of the high temperature of the back plate etc forming such conventional electric condenser microphone but is electret, it difficults to apply the SMD (Surface Mount Device) to the electric condenser microphone since the drawing is demoralized. That is, the trend that miniaturizes product while the manufacturing technique of the electronic product develops. The surface mounting technology (SMT: Surface Mount Technology) is widely used for the manufacture of this small size product. If wants to apply the surface mounting technology, because the high temperature is added in the part, the weak part cannot apply the SMD technology in the SMD reflow to temperature. But there is a problem that the charged electronics is easily deviated if the humidity highs or temperature enters into and the performance of electret is degraded since compulsorily injecting the electronics into the organic plastic film (for example, for example, FEP, PET, PTFE etc) fusioned on the metal plate and the electret microphone becoming.

Technical Challenges of the Device

21 An object of the present invention to provide the electric condenser microphone capable of SMD it uses the base having to solve problems described in the above, the insulation property the IC device having the gain which is formed into the structure of protecting electret and in which the property of electret is not degraded in the high temperature, and using materials stronging against the high temperature, and high in order to prevent the desensitization of the microphone which is caused by since the potential value of electret falls to the SMD reflow process.

▸ Structure & Operation of the Device

22 As to the electric condenser microphone consisting of the case and polar ring, diaphragm, spacer, back plate, first base, second base, PCB, the first base is to the structure of protecting diaphragm, spacer and back plate and it characterizes that the property of the electret formed at the surface mounting device (SMD) reflow process in diaphragm or the back plate is not degraded. Moreover, characterize to use the IC device having the gain high in order to prevent the desensitization of the microphone which is caused by since the potential value of electret falls from the SMD reflow process.

23 And it is made among the group consisting of the fluorine resin series consisting of the polymer based or the PTFE (TFE), FEP, PFA, ETFE, CTFE, PVDF. PVE, and the PCTFE, ECTFE, EPE, nylon 6, PP, the hardening PVC etc consisting of the polymer based or the PTFE (TFE), FEP, PFA, ETFE, CTFE, PVDF. PVE, and the PCTFE, ECTFE, EPE, nylon 6, PP, the hardening PVC etc into one material. The part mounted in PCB is soldered among the high temperature cream solder consisting of the sn / Ag, sn / Cu, sn / Ag / Cu, the Sn / Ag / Cu / Sb (The CASTIN ™ Alloy), the Sn / Ag / Cu / Bi (The OATEY ™ Alloy) etc to a one.

24 Moreover, in the connection terminal which is formed in PCB in order to interlink microphone to the external circuit, the circular terminal for the Vdd connection is formed in the inner side. The constant interval is left and the ground terminal of circular is formed in outside. And in order to discharge the gas created in the SMD reflow the ground terminal separates with the gas exhaust groove. It is high projected than the PCB side and the Vdd terminal and ground terminal prevent the short circuit which can be created in the SMD reflow task.

25 The attached preferred embodiment of the present invention decides to be explained hereinafter in detail.

26 Fig. 2 is a cross-sectional view showing the overall structure of the electret microphone according to the present invention.

27 In the electric condenser microphone (200) according to the present invention, the acoustic part and PCB circuit part is into one body assembled as shown in Fig. 2 with one cylindrical case (202).

28 The acoustic part of the microphone according to the present invention is protect with the first base (212) which is to the same cylindrical as the cylindrical case (202) and is inserted into the case (202) to the fit system and is to the insulating material stronging against the high temperature. The spacer (spacer: 208) is left in interval and the diaphragm (Diaphragm: 206) and back plate (Back plate: 210) put opposite in the first base (212) inner side.

29 The diaphragm (206) is contacted and supported in the case (202) in which the hidden merits (202a) is formed through the polar ring (204) which is to conductor of cylindrical. And the back plate (210) is supported with the second base (214) which is to conductor of cylindrical on the PCB substrate (216). In one among the diaphragm (206) or the back plate (210), electret is formed. The front electret lice that electret is formed in the diaphragm (206). The white electret lice to be formed on the back plate (210). And in the back plate (210), the through-hole (210a) for making have directivity in microphone is formed.

30 Referring to Fig. 2, the back plate (210) according to the present invention or the spacer (208), and the diaphragm (206) and the first base (212) are made of the fluorine resin series having the heat resistance and drug resistance, and the material of the polymer based or the plastic series. That is, in the invention, the manufacture of the electret microphone capable of SMD the high temperature material is used possibles. The various kind including the Polymer series or the plastic series, the fluorine resin series etc. has to the high temperature material. As to the shape of the high temperature material, not only film or the sheet or the roll (film/sheet/roll) form but also the bulk form can use. There can be the fluorine resin series the PTFE (TFE), FEP, PFA, ETFE, CTFE, PVDF. PVE, and the PCTFE, ECTFE, EPE, the Nylon 6, PP, the hardening PVC etc the ASA, the Nylon 6, the Nylon 66, the Nylon 46, LCP, PBT, PC, the PC / ABS, the PC / PBT, PEEK, PEN, PES, PET, PMMA, POM, PTFE, SAN, PPS, SBR, TPU etc has as the Polymer series (the plastic series) this high temperature material is into looked little more in detail.

31 And the first base (212) and the second base (214) form the internal space with the PCB (216) with being supported with the PCB (216). The circuit component (IC etc) such as the IC (218) and MLCC (219) is mounted in the PCB top of the substrate (216). Here, the field effect transistor (FET) or the amplifier (Built in gain AMP) etc. have to IC mounted in the PCB (216). The analog to digital converter (ADC) for the digital conversion or the decimation filter and digital interface IC etc. can be included according to need.

32 Moreover, in the SMD reflow process, by using for high temperature cream solder in order to prevent from parts (218,219) attached to the PCB (216) top of the substrate coming off, the part is to attached. There can be the Sn / Ag, the Sn / Cu, the Sn / Ag / Cu, the Sn / Ag / Cu / Sb (The CASTIN ™ Alloy), the Sn / Ag / Cu / Bi (The OATEY ™ Alloy) etc as the kind of the high temperature cream solder which can be used in the working example of the present invention.

33 In the meantime, the connection terminal (220) is formed and the microphone (200) can be attached to the other PCB (for example, PCB of the cellular phone) to the SMD mode so that the open surface of the PCB (216) be projected to alternate long and short dash line of the case (202) than the marked aperture. In the connection terminal (220) for this, the circular terminal (225) for the Vdd connection is formed as shown in the figures 3 and figures 3 in the inner side. The constant interval is left and the ground terminal (221~223) of circular is formed in outside. And in order to discharge the gas created in adhesion by the SMD mode this ground terminal (221~223) separates with the gas exhaust groove (227) of 3 from 3. That is, in order to discharge the toxic gas created among the SMD reflow process in the cream solder so that SMD possible the microphone of the present invention is designed. It highs than the side which is the curling of microphone by the connection terminal (220) so that the projecting shape being and it is designed so that connection with PCB facilitate in the SMD reflow process.

34 Moreover, by being formed for high temperature BGA (Ball Grid Array) ball in each connection terminal it highs than the curled side of microphone and the connection terminal can be designed as shown in Fig. 5 and Fig. 6 so that PCB and connection facilitate in the SMD reflow process.

35 It as to the operation of the electric condenser microphone of this kind of invention thes same like next.

36 If the connection terminal (220) of the microphone according to the present invention is connected to the external circuit board and Vdd and GND power source are applied, the microphone according to the present invention acts. At this time, the diaphragm (206) is electrically connected through the polar ring (204) and case (202) to the PCB (216) circuit. The back plate (210) is electrically connected through the second base (214) to the PCB (216) circuit.

37 In this kind of state, while the sound pressure in which user flows in the word through lower-part, and the hidden merits (202a) is added in the diaphragm (206), the diaphragm (206) vibrates. Interval between the diaphragm (206) and the back plate (210) accordingly change. And if interval changes with the sound pressure, the electrostatic capacity formed with the diaphragm (206) and back plate (210) is signal-changed and the change of the signal (voltage) it electricals, according to the sound wave can be obtained. After two signal being delivered through the second base (214) to the IC (218) mounted in the PCB (216) and being amplified, it is transmited through the connection terminal (220) to outside.

38 In the meantime, the electret microphone (200) according to the present invention can prevent from the property of electret being degraded in the SMD reflow process with the high temperature since the structure where the first base (Base I: 212) formed into the insulating material of the high temperature protects the acoustic part (diaphragm, spacer, the back plate etc) of microphone. That is, in the high temperature by the first base (212), it secludes to be discharged the electric charge of electret and charged electret can be protected.

39 Moreover, in the microphone (200) of the present invention, the IC having the high in order to prevent the desensitization of the microphone which is caused by since the potential value of electret falls from the SMD reflow process. Gain in which it uses the diaphragm (206) or the spacer (208), the back plate (210), the first base (212) etc. as the material of the high temperature, and the electret is formed on especially, for high temperature fluorocarbon polymers film and the changing of characteristic width of the electret does not severe in the SMD reflow temperature, and is used. And in order to SMD makes it possible the microphone (200) can discharge the toxic gas created among the SMD reflow process in the cream solder. The terminal is projected and SMD facilitates.

▸ Structure & Operation of the Device

40 As illustrated in the above, according to the invention, the electric condenser microphone capable of the surface mounting device (SMD) it uses the gas exhaust groove formation and connection terminal in the fifth connection terminal to the projecting shape can be offered.

41 Therefore, the existing electric condenser microphone 230 ℃ or greater has the advantage that reflow impossibled but in the electric condenser microphone of the present invention, the SMD reflow possibles in the high temperature more than 260℃. The process of the product which accordingly uses the microphone of the present invention can be improved and the cost can be reduced. And the inferiority can be reduced. Furthermore, by using the IC device having the high gain the sensitivity of microphone change of after and SMD reflow former can be kept with the normal sensitivity allowed value ±1dB within.

42 In the above case, in range which it does not escape with reference to the preferred embodiment of the present invention from the thought and domain of the invention in the skilled person skilled in the art of the target technology part is the range of below patent claim it explained, it will be able to understand to be various, can change the invention with correction.

Scope of Claims

Claim[1] :

43 The first base as to the electric condenser microphone, consisting of the case and polar ring, diaphragm, spacer, back plate, first base, second base, PCB.

45 The electric condenser microphone possibling SMD wherein it is to the structure of protecting diaphragm, spacer and back plate and the property of the electret formed at the surface mounting device (SMD) reflow process in diaphragm or the back plate is not degraded.

Claim[2] :

46 The first base as to the electric condenser microphone, consisting of the case and polar ring, diaphragm, spacer, back plate, first base, second base, PCB.

48 The electric condenser microphone possibling SMD wherein it is to the structure of protecting that electret is formed among diaphragm and back plate in one and the property of the electret formed at the surface mounting device (SMD) reflow process in diaphragm or the back plate is not degraded.

Claim[3] :

49 Deletion .

Claim[4] :

50 Deletion .

Claim[5] :

51 The electric condenser microphone that possibles SMD, electric condenser microphone comprising: the field effect transistor (FET).

Claim[6] :

52 The electric condenser microphone that possibles SMD, electric condenser microphone comprising: the amplifier (Built in gain AMP).

Claim[7] :

53 The electric condenser microphone that possibles SMD, electric condenser microphone comprising: the analog to digital converter (ADC) for the digital conversion.

Claim[8] :

54 The electric condenser microphone that possibles SMD, electric condenser microphone comprising: the decimation filter and digital interface IC.

Claim[9] :

55 The electric condenser microphone possibling SMD, wherein the connection terminal which is formed in PCB in order to interlink microphone as to the first claim or claim 2 to the external circuit the groove for discharging the gas created in the SMD reflow process is formed.

Claim[10] :

56 The electric condenser microphone possibling SMD, wherein the connection terminal as to claim 9 the circular terminal for the Vdd connection is formed in the inner side; the constant interval is left and the ground terminal of circular is formed in outside; and the ground terminal separates with the gas exhaust groove in order to discharge the gas created in the SMD reflow.

Claim[11] :

58 The electric condenser microphone possibling SMD, wherein the connection terminal as to claim 9 it highs than the curled side of microphone so that the projecting shape be by and, it is designed so that PCB and connection facilitate in the SMD reflow process.

Claim[12] :

60 The electric condenser microphone possibling SMD, wherein the connection terminal as to claim 9 it highs than the curled side of microphone by being formed for high temperature BGA (Ball Grid Array) ball in each connection terminal and, it is designed so that PCB and connection facilitate in the SMD reflow process.